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WESTINGHOUSE  
ELECTRICAL EQUIPMENT  
*for*  
MOTION-PICTURE THEATRES





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CCA



C-1925

# Westinghouse Electrical Equipment for Motion Picture Theatres



Circular 1640

Westinghouse Electric & Manufacturing Co.  
East Pittsburgh, Pa.



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## FOREWORD

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**Q**UALITY is always recognized and appreciated by the public, regardless of the manner in which it is presented, whether it appears in the form of a manufactured product, a service, or good public entertainment. In any business an established reputation for quality builds good will and insures success—it is a real asset.

In the motion picture theatre business, quality means artistic decorations, comfortable seats, efficient ventilation, good music, and above all, a good picture because patronage depends to a great extent upon the results produced on the screen.

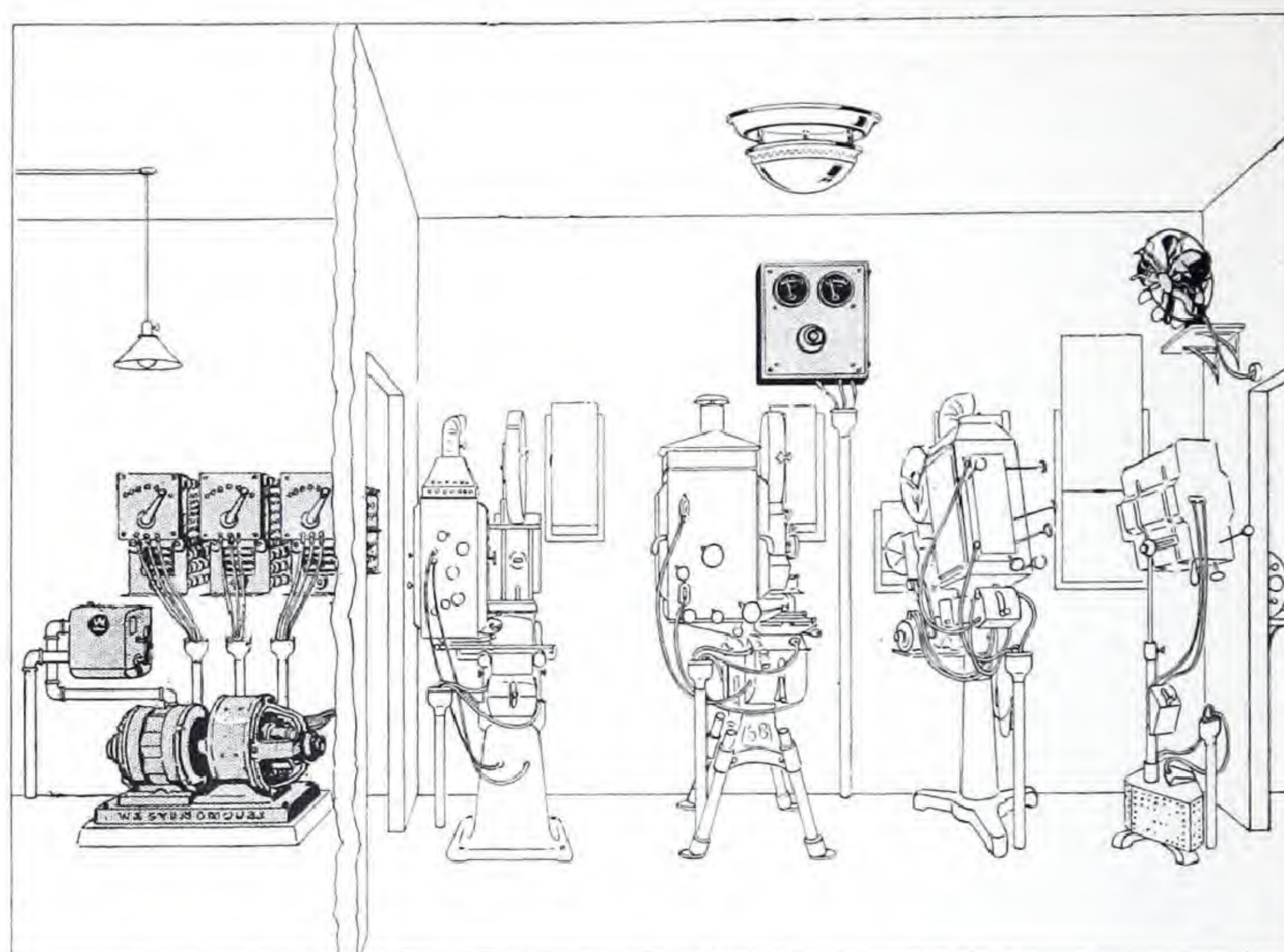
The two factors which contribute the most to the presentation of a good picture are the film itself and the light for projecting the picture on the screen. Since the quality of light depends so largely upon the electrical equipment, it logically follows that its selection is a matter of great importance to every motion picture theatre owner.

This publication deals principally with the electrical equipment required for first-class projection—it describes the equipment manufactured by Westinghouse, and explains why it fulfills the requirements and thereby enables the motion picture theatre owner to offer the public quality in the form of first-class projection.



## ELECTRICAL EQUIPMENT FOR MOTION PICTURE PROJECTION

**I**N the manufacture of electrical equipment for this service, Westinghouse has adhered strictly to one policy; namely, to build equipment which is efficient, reliable, and of the best mechanical and electrical design; which is simple to operate, and which has electrical characteristics adapted to all the requirements of first-class projection. In order to be qualified to build such equipment, Westinghouse



View of Typical Projection and Motor-Generator Room

has engineers who continually study the problems of better projection as they pertain to the electrical apparatus—they are specialists and their knowledge of what is needed has been acquired through close contact with the actual conditions existing in the modern motion picture theatre.

Westinghouse equipment for motion picture projection meets all the requirements of this exacting service. Each individual piece of apparatus has been designed with the end always in view of obtaining the best results on the screen. A steady, well-illuminated picture, pleasing to your patrons from a projection standpoint, is therefore assured and at a minimum expense for power.



## WHAT IS NEEDED TO PRODUCE BEST RESULTS

The one most essential requirement for first-class projection is *direct current of constant value*.

Although the recent improvements in carbons have increased the efficiency of the alternating-current arc, it still remains a fact that direct current is far superior to alternating current, as regards *quality of light, uniform illumination, steadiness and economy in operation*. Since every experienced projectionist is familiar with this fact, it seems unnecessary to give a detailed explanation of the distinct advantages of the direct-current arc. The great economy in the use of direct current is clearly shown in the table below:

Approximate Horizontal Candle Power	Arc Amperes	
	D.C.	A.C.
2000	12	33
4000	17	50
6000	22	67
8000	28	83

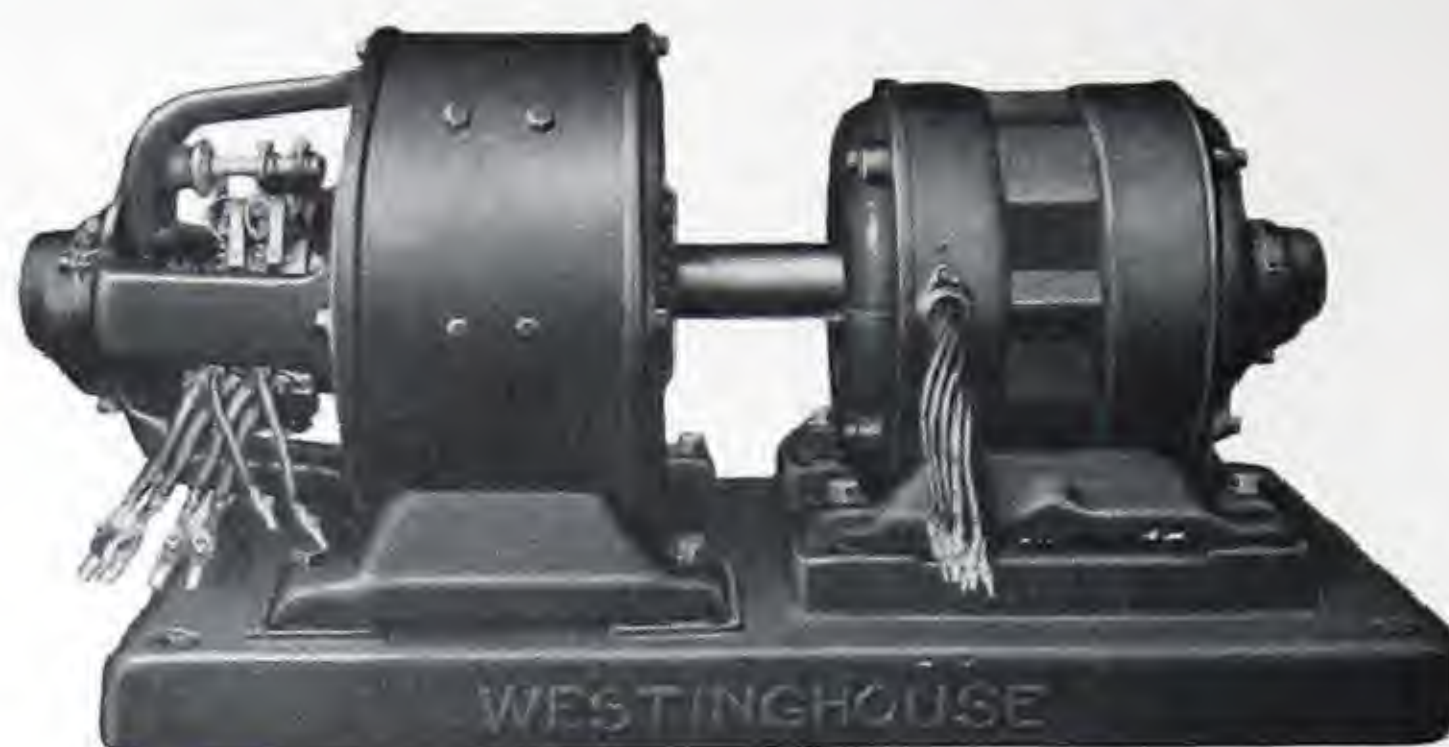
Comparison of Current Consumed by A. C. and D. C.  
Arcs for the Same Candle Power

The direct current should be of constant value because any fluctuations of current in the arc circuit are liable to cause an undesirable variation in the light intensity which is noticeable on the screen. Any unsteady illumination detracts from the picture and is generally accompanied by the risk of losing patronage.

It is obvious, therefore, that the motion picture theatre owner who wants a reputation for the best results in picture projection, must install direct-current equipment which will give steady illumination on the screen.



## WHY A MOTOR-GENERATOR SHOULD BE USED



A. C. to D. C. Motor-Generator

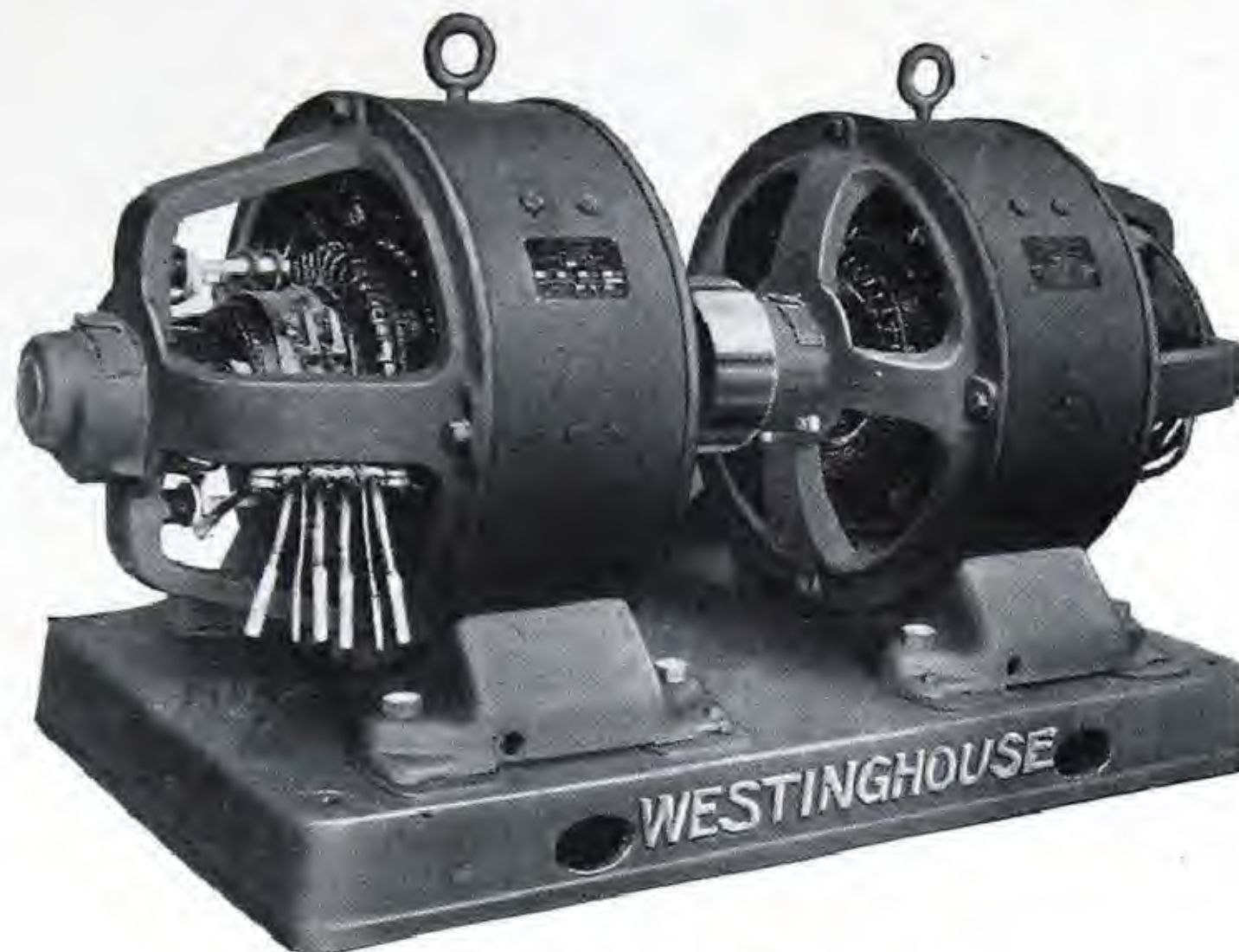
No theatres are furnished with direct current at the proper voltage for economic arc operation, while alternating current is available to approximately 65 per cent of the theatre owners. Experience has proved the motor-generator to be the most desirable piece of apparatus for changing the available power supply into direct current at a voltage suitable for operating the arcs. Unlike the rotary converter, with its possibility of building up, during its starting period, with the wrong polarity on the arc carbons, the motor-generator requires only one start. The positive lead on the generator always supplies a positive potential to the upper carbon with the result that a projection machine can be placed in operation with no loss of time. Furthermore, with a motor-generator the direct current for the arc is not affected by minor fluctuations which may occur in the A.C. supply voltage, especially in outlying districts.

## WHY THE ARCS SHOULD BE OPERATED IN MULTIPLE AND NOT IN SERIES

It has been previously stated that the fundamental requirement for first-class projection is direct current of constant value. In order to meet this condition, the electrical equipment must be designed on the basis of supplying current to the arcs in parallel or multiple because, if the arcs are connected in series, any fluctuation or interruption of the light from one arc is accompanied by a corresponding fluctuation or interruption of the light from the other arc. To illustrate, assume that No. 1 arc is projecting a picture on the screen and No. 2 arc is being prepared for projecting the next reel. During this time, before No. 2 arc becomes stable, it is liable to flicker or it may be lost. Now, if these two arcs are in series, whatever happens to No. 2 arc will also happen to No. 1 arc which is projecting the picture. Westinghouse equipment insures against this condition because the arcs are operated in multiple.



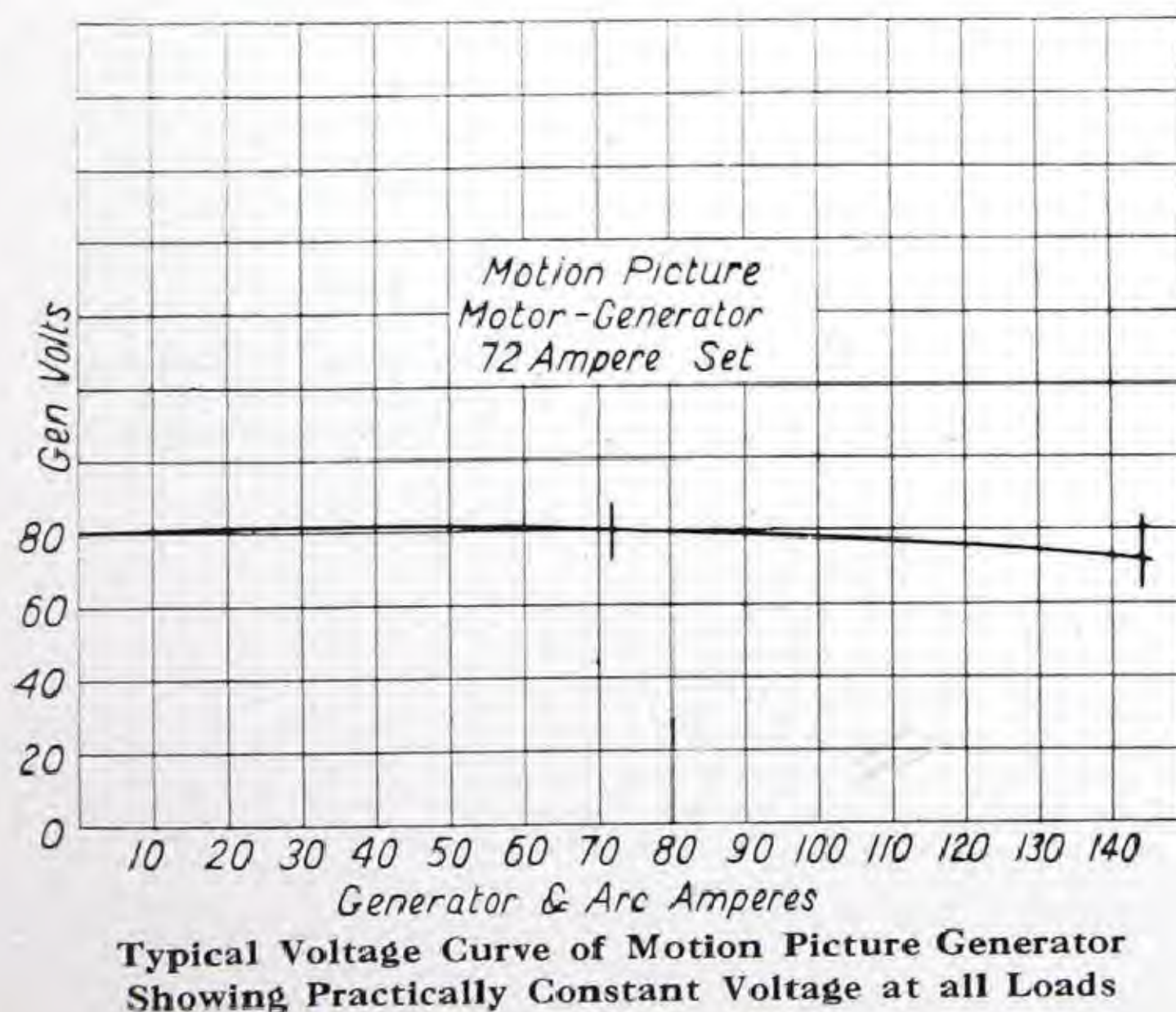
## A NUMBER OF ARCS OF DIFFERENT AMPERAGE CAN BE OPERATED SIMULTANEOUSLY



D. C. to D. C. Motor-Generator

The greatest advantage of Westinghouse equipment is the fact that a number of arcs of different amperage can be operated simultaneously. The number of arcs is limited only by the size of the equipment. Many theatres find occasion to operate the projection machine, stereopticon lamp, spot and flood lamp all at the same time, and this can be accomplished with Westinghouse equipment; whereas, with a two-arc series system, an extra circuit from the supply line would be necessary. If the supply line is D. C. excessive loss would occur in the necessary resistors, and if the supply is A. C. the theatre owner does not derive the most benefit from his investment in equipment to furnish direct current for operating the arcs.

## THE COMPLETE MOTOR-GENERATOR EQUIPMENT



This equipment consists of a *motor-generator*, with either a single phase, polyphase, or 230 volt D. C. motor, *field rheostat*, *two ballast rheostats*, *two enclosed short-circuiting switches*, *control panel* and *motor starter*. The generator is compound-wound and designed to give approximately the same voltage during the "changeover" when both arcs are operating, as when one arc only is operating. The motors are of special design so as to drive the generators at practically constant speed, under the wide fluctua-



tions in load which occur in this service. A constant speed, 230 volt D. C. motor is furnished with the D.C. to D.C. motor-generators. All equipments have ample capacity to carry the increased load during the time the two projection machines are being operated.



Front View of  
Instrument Panel

**The Ballast Rheostats** are connected one in series with each arc, and serve to stabilize each arc circuit by damping out the fluctuations in current which would be caused by variations in the resistance of the arc circuit. These rheostats are of the cast iron grid type with an adjusting handle for changing the resistance. Suitable enclosing covers provide for adequate ventilation and allow the use of the rheostats anywhere without fire risk.



Side View of  
Instrument Panel



Type D  
Starting Rheostat

**The Instrument Panel** is a dull-finished black slate arranged for wall mounting on brackets. The two sides, top and bottom, are enclosed by wire mesh and the back is enclosed by a steel plate. Mounted on the panel is a voltmeter, ammeter, and generator field rheostat for adjusting the generator voltage. The instruments have a black dial with white scales and pointers so that they may be easily read.



Ballast Rheostat



Type 815-816  
Starting Switch

**The Motor Starter** depends on the kind of power available. With alternating-current service either a type No. 815 or No. 816 quick-make-and-break switch, or a type "A" auto-starter is furnished, the type of starter being determined by the size of the equipment. Starting rheostats are furnished with the D.C. to D.C. motor-generators.



Type A Auto-Starter

The motor-generators with accessories described above can be furnished in different sizes to meet the needs of the smallest to the largest motion picture theatre.



## TABULATION OF STANDARD RATINGS

Rating in Amperes	SK Generator		Motor		Mechanical Construction	
	Kilowatts	Volts	Horsepower	Full Load R. P. M.	Type Shaft	Number of Bearings

## TYPE AR MOTORS

Single Phase—110 and 220 Volts—60 Cycles

36	$2\frac{3}{4}$	75	$4\frac{1}{2}$	1750	Coupled	4
55	$4\frac{1}{8}$	75	7	1750	Coupled	4
72	$5\frac{2}{5}$	75	9	1750	Coupled	4

## TYPE CS MOTORS

220 and 440 Volts, 2 and 3 Phase—550 Volts, 3 Phase—60 Cycles

36	$2\frac{3}{4}$	75	$4\frac{3}{4}$	1750	Common	2
55	$4\frac{1}{8}$	75	$6\frac{1}{2}$	1750	Coupled	3
72	$5\frac{2}{5}$	75	9	1750	Common	2
90	$6\frac{3}{4}$	75	11	1750	Common	2
110	$8\frac{1}{4}$	75	13	1750	Common	2

## TYPE CS MOTORS

220 and 440 Volts, 2 and 3 Phase—550 Volts, 3 Phase—50 Cycles

36	$2\frac{3}{4}$	75	$4\frac{3}{4}$	1465	Common	2
55	$4\frac{1}{8}$	75	$6\frac{1}{2}$	1465	Coupled	3
70	$5\frac{1}{4}$	75	9	1465	Common	2
90	$6\frac{3}{4}$	75	11	1450	Common	2
110	$8\frac{1}{4}$	75	13	1450	Common	2

## TYPE CS MOTORS

110, 220 and 440 Volts—3 Phase—25 Cycles

40	3	75	$5\frac{1}{2}$	1450	Common	2
70	$5\frac{1}{4}$	75	$8\frac{1}{2}$	1450	Common	2
90	$6\frac{3}{4}$	75	$11\frac{1}{2}$	1450	Common	3

## D. C. TYPE SK MOTORS

230 Volts

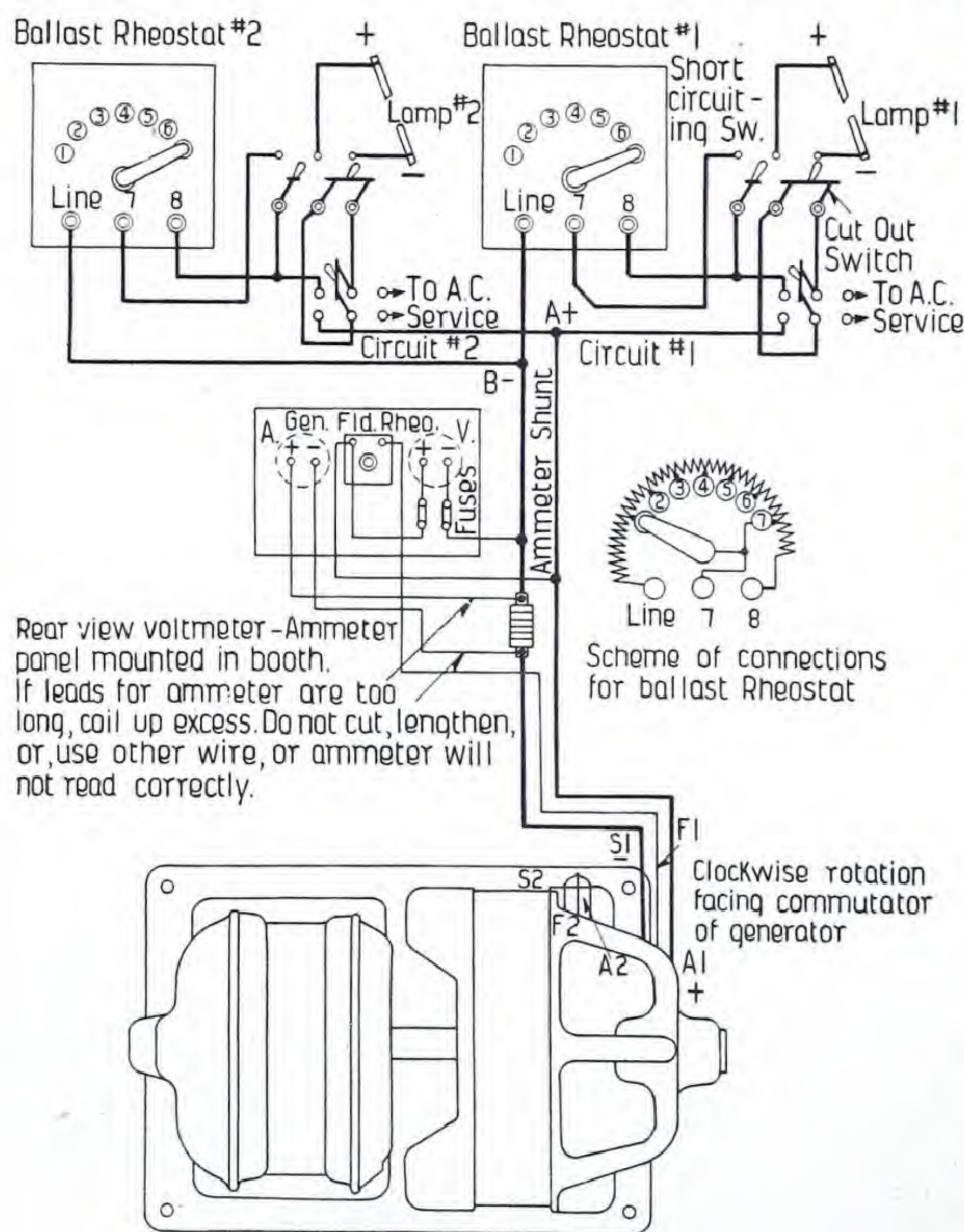
36	$2\frac{3}{4}$	75	$4\frac{1}{2}$	1735	Coupled	3
55	$4\frac{1}{8}$	75	7	1745	Coupled	4
72	$5\frac{2}{5}$	75	9	1750	Coupled	3
90	$6\frac{3}{4}$	75	$11\frac{1}{2}$	1750	Common	2



## BALLAST RESISTORS FOR USE WITH SPOT, FLOOD AND STEREOPTICON LAMPS

No first-class theatre has complete equipment without spot and flood lamps, together with one or more stereopticon lamps. Since Westinghouse motor-generator equipment for motion picture theatres provides a constant voltage source of supply to the arcs connected in multiple circuits, extra circuits from an outside source are not necessary for lamps of different amperage can be operated from the one generator equipment by using Westinghouse ballast resistors.

### OPERATING INSTRUCTIONS



1. Before starting the motor-generator, see that all switches are open and that the ballast rheostat contact arms are on the last button to the right, indicated as button No. 7 in the diagram.

2. Close the motor starting switch.

3. When the motor-generator reaches full speed, adjust the generator field rheostat until the generator voltage is approximately 80 volts, as indicated by the voltmeter.

4. Close the cut-out switch on the motion picture projection machine No. 1. When the carbons are warm, strike the arc by separating the carbons slightly; then close the single-pole control switch which short circuits part of the ballast resistance.

5. Adjust the carbons until the potential across the arc is approximately as indicated by the following table:

Arc Amperes	Approximate Arc Volts
36.....	55
55.....	60
72.....	63
90.....	65
110.....	67

Then, if the current is not of the correct value to give the proper illumination on the screen, move the contact arm of the ballast rheostat to the left, one button at a time until the proper illumination is obtained. The button which gives the proper illumination (with arc voltage at value given above) should be noted, so that it can be identified when projection machine No. 1 is again placed in operation.

6. A short time before the end of reel No. 1, close the cut-out switch on projection machine No. 2 in order to warm up the carbons.

7. When the carbons are warm, strike the arc; then close the single-pole control switch which short circuits part of the ballast resistance in ballast rheostat No. 2.

8. Adjust the carbons of No. 2 projection machine, in manner specified in paragraph 5.

9. At the proper time, disconnect the circuit to No. 1 projection machine by opening the cut-out and control switches; then start operating No. 2 projection machine.

10. Before shutting down the motor-generator, disconnect the direct-current end by opening all the cut-out and control switches; then disconnect motor from supply line.



## SMALL MOTORS USED IN THE PROJECTION ROOM

Westinghouse fractional horsepower motors can be used to good advantage in the projection room for replacing hand operation with power drive.

The type CAH alternating-current motor, single phase, 110/220 volt, 60 cycles, can be supplied in sizes 1/8, 1/6, 1/4 hp. Standard accessories are pulley, cord and plug. The bracket-type construction is a desirable feature of these motors. Openings in the lower part of the brackets allow a good circulation of air to keep the motor cool, and the protecting flanges prevent anything from falling into the motor. With these brackets the motor is practically totally enclosed. This "safety first" feature is highly desirable for all motors operating in the projection room. Sliding bases with belt-tightening device can be supplied for motors in 1/6 and 1/4 hp. sizes.



Type CAH Motor



Type CDH Motor

Type CDH direct-current motors, 115 and 230 volts, compound-wound, can be furnished in sizes 1/8, 1/6, 1/4 and 1/2 hp. The 1/2 hp. motors can be furnished shunt-wound if desired. Standard accessories are pulley, cord and plug. Sliding base with belt-tightening device can be supplied for the 1/6, 1/4 and 1/2 hp. motors. These motors also possess a very desirable feature incorporated in the line of type CAH A. C. motors; namely, the bracket type of construction which provides ample ventilation, and completely protects the windings and rotating parts.

Type CA, 110 or 220 volt, single phase, 60 cycle and type CD, 115 or 230 volt, D. C. motors can be furnished in 1/20 and 1/12 hp. sizes. Cord, plug and pulley are standard accessories.



Type CA Motor





A. C. Buffing and Grinding Motor



D. C. Buffing and Grinding Motor

Westinghouse buffing, polishing and grinding motors are suitable for light polishing and grinding of all kinds. These little motors are quiet in operation, clean and simple to install. Starting and stopping are effected by a small switch in the base. Little attention beyond occasional lubrication is needed.

## FANS FOR EFFICIENT VENTILATION

Westinghouse-Ventura fans provide a very effective means for ventilating motion picture theatres at all seasons of the year. They can be operated either to introduce fresh air or to exhaust foul air as the conditions may dictate.

These units are specially suitable for exhausting large volumes of free air against little or no resistance. They are quiet running, very efficient in operation, easily installed, require little attention and can be operated from the lighting circuit.

Westinghouse Sirocco Blowers can be used where the air must be forced through piping or against a resistance. They are very desirable for providing effective ventilation for the projection room.

This type of blower is compact, neat in appearance, light in weight, inexpensive to operate and requires no attention beyond an occasional inspection and oiling.



Westinghouse-Ventura Fan





Oscillating Fan for Mounting on Wall



Ceiling Type Gyrating Fan

Westinghouse Fans are made in a large variety of sizes and types for use in motion picture theatres. They can be located so that a most effective distribution of breeze without draft is obtainable, adding greatly to the comfort of patrons during hot weather.

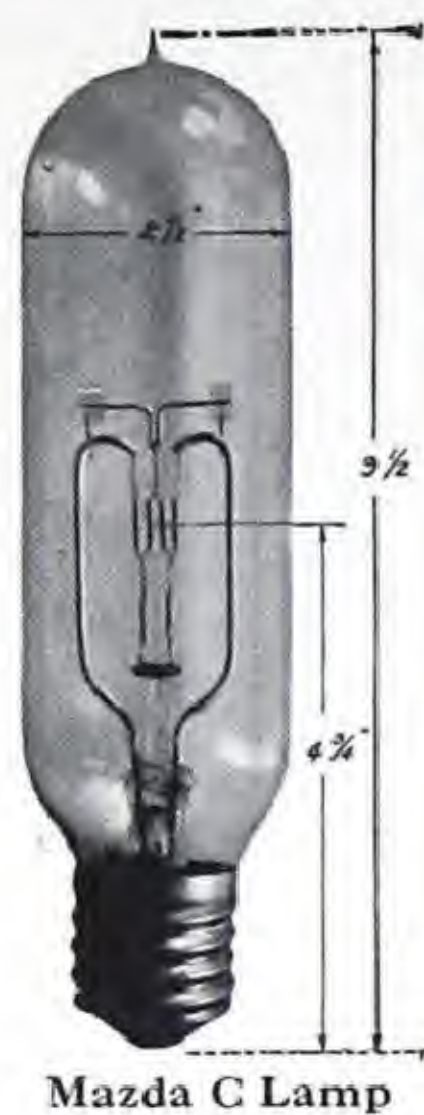
Westinghouse Fans are handsome in appearance, quiet in operation and need no attention beyond filling the grease cups with vaseline once a year. They are made in a variety of sizes from 8 to 16 inches in diameter, both in oscillating and non-oscillating types. The gyrating fan, which is suspended from the ceiling and revolves as it operates, is particularly effective as it will put in motion as much air as four ordinary non-oscillating fans.



Westinghouse Sirocco Blower



## MAZDA C LAMPS FOR MOTION PICTURE PROJECTION



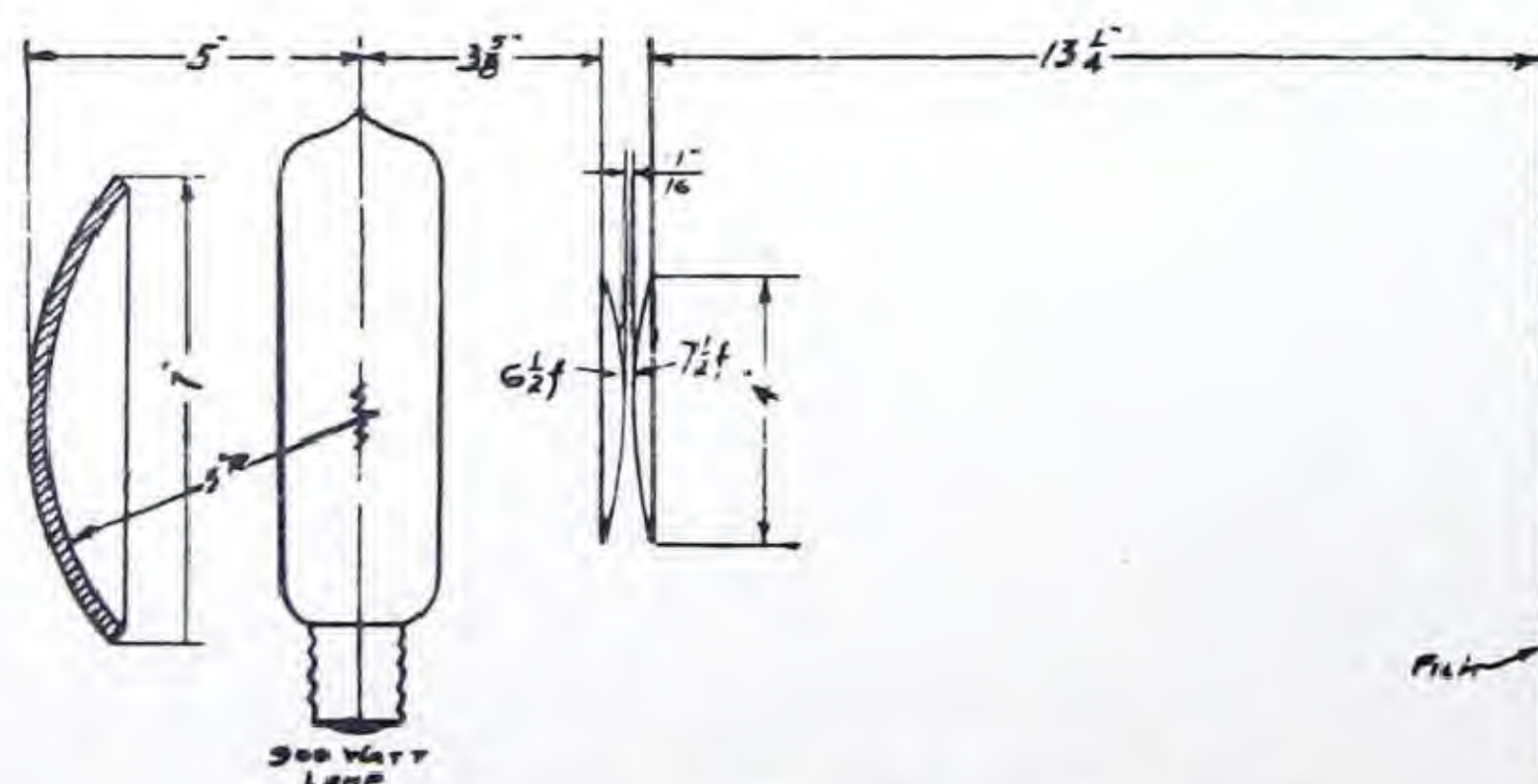
Mazda C Lamp

The Westinghouse Company furnishes Mazda C Lamps of a special design for motion picture and stereopticon machines, using this type of light source. These lamps are suitable for use in all Mazda lamp houses and adapters now on the market. The two types of lamps recommended for motion picture and stereopticon projection are the 900 watt and 600 watt lamps. The 900 watt motion picture lamp is suitable for use in theatres up to 100 foot throw, with a 9 x 12 screen. The 600 watt is used in stereopticon and small motion picture projectors for schools, churches and club rooms. These lamps are the ideal source of illumination when a clear and perfectly steady picture is desired, and where the Mazda lamp gives sufficient illumination. The lamps can be operated equally satisfactorily from direct or alternating current.

The operation of the Mazda lamp for motion picture projection is very simple. It is only necessary to set the optical system, as shown below, when the lamp is installed, and all during the life of the lamp no other adjustment is required. A spherical mirror is employed in connection with the Mazda C motion picture lamp, its purpose being to reflect the filament coils back through the lamp in such a manner as to form a solid sheet of light, as illustrated. This mirror must be carefully focused when the lamp is installed in order to obtain uniform screen illumination. After this simple adjustment is obtained, no further attention is necessary; simply turn the lamp on and off and a clear white sheet of light will be projected upon the screen. These motion picture lamps develop their rated candle power when operated at their rated voltage and current. If operated on lower than the specified current, their efficiency is materially reduced, while if operated at higher current, their life is shortened appreciably. Since the supply voltage is never constant, some form of regulating device is necessary. Westinghouse can supply a hand-operated rheostat for regulating the current on



Filament Coils Reflected to Form a Solid Sheet of Light



Optical Distances with Plano-Convex Condensers

direct-current circuits, and an automatic current regulator for alternating-current circuits. This regulator is quite simple and will automatically keep the current constant and at the proper voltage, requiring no attention and practically no upkeep after its installation.



## MAZDA LAMPS FOR GENERAL ILLUMINATION

Westinghouse Mazda Lamps can be used for many purposes in and around the motion picture theatre. Although general illumination is more or less secondary, it is also necessary; and with appropriate lighting fixtures, very beautiful decorative effects can be obtained.

Westinghouse Mazda Lamps are available also for the effective outside illumination of the theatre. Standard lamps can be used for outlining the theatre front while for the electric signs, special 5 and 10 watt sign-lighting lamps can be furnished.

## WESTINGHOUSE SERVICE

The interest of the Westinghouse Company in its products does not cease after they have been sold. In all principal cities, service departments are maintained whose force is qualified by training and experience not only to install Westinghouse equipment but also to instruct the owner how to correctly operate and take care of his apparatus. In the event of breakdown or accident, Westinghouse Service is ready to put the apparatus in working order with as little delay as possible.

## USERS OF WESTINGHOUSE EQUIPMENT

A partial list of motion picture theatres and studios in the United States which use Westinghouse Equipment for Motion Picture Projection, is given below.

THEATRES		
Grauman's Million Dollar Theatre, Los Angeles.	Rialto Theatre, Tacoma, Wash.	Parthenon, Brooklyn, N. Y.
Superba Theatre, Los Angeles.	Ellensburg Theatre, Ellensburg, Wash.	American, Freeport, L. I.
Strand Theatre, Los Angeles.	Lyric Theatre, Shelton, Wash.	Palace, Corona, N. Y.
Apollo Theatre, Hollywood, Cal.	Mission Theatre, Mt. Vernon, Wash.	Kingsway, Brooklyn, N. Y.
New Apollo Theatre, Los Angeles.	Ideal Theatre, Stanwood, Wash.	New Palace Theatre, Dallas, Texas.
Yost Theatre, Santa Ana, Calif.	Main Theatre, Sharpsburg, Pa.	Garrick Theatre, Dallas, Texas.
Coliseum, San Francisco.	Anchor Theatre, Pittsburgh, Pa.	Mission Theatre, Abilene, Texas.
Rialto, San Francisco.	Pitt Theatre, Pittsburgh, Pa.	Dixie Theatre, Athens, Texas.
Verdi, San Francisco.	Majestic Theatre, Rochester, Pa.	Mission Theatre, Amarillo, Texas.
T & D Theatre, Oakland, Calif.	Rowland Theatre, Wilkinsburg, Pa.	National Theatre, Breckenridge, Texas.
Loew's State Theatre, Oakland, Calif.	Triangle Theatre, East Liberty, Pitts- burgh, Pa.	Mission, Dalhart, Texas.
Liberty Theatre, Fresno, Calif.	Braddock Theatre, Braddock, Pa.	Rialto, Demisa, Texas.
Kinema Theatre, Fresno, Calif.	Colonial Theatre, Braddock, Pa.	Strand, Graham, Texas.
California Theatre, Bakersfield, Calif.	Coliseum Theatre, New Castle, Pa.	Queen, Houston, Texas.
T & D Theatre, Hanford, Calif.	Pearl Theatre, Castle Shannon, Pa.	Capitol, Oklahoma City.
Hippodrome Theatre, Taft, Calif.	Wm. Penn Theatre, N. S., Pittsburgh, Pennsylvania.	Temple, Ranger, Texas.
Loew's State Theatre, Stockton, Calif.	Regent Theatre, Detroit, Mich.	Travis, Sherman, Texas.
Strand Theatre, Modesto, Calif.	Park Theatre, New York.	Isis Theatre, Boulder, Colo.
California Theatre, Turlock, Calif.	Artic, Artic, N. J.	Lyric Theatre, Fort Collins, Colo.
Olympic Theatre, Philadelphia.	Plaza, Paterson, N. J.	Liberty Bell Theatre, Leadville, Colo.
Capitol Theatre, Atlantic City, N. J.	Costello, New York.	Strand Theatre, Rawlins, Wyoming.
Third Street Theatre, Easton, Pa.	Apollo, Jersey City, N. J.	Colonial Theatre, Idaho Falls, Idaho.
Gordans Olympia, Cambridge, Mass.	McKinley Square, New York City.	Loew's Theatre, Salt Lake City, Utah.
Gordans Olympia, New Bedford, Mass.	Keeneys, Bay Ridge, Brooklyn, N. Y.	
Palace Theatre, Artic, R. I.	Naomi, Newark, N. J.	
Jefferson Theatre, Springfield, Mass.	Palace, Greenville, R. I.	
Mystic Theatre, Malden, Mass.	National, Brooklyn, N. Y.	
Portola Theatre, Seattle, Wash.	Rialto, West New York.	

## STUDIOS

Thos. Ince Studios.  
Goldwyn Studios.  
Famous Players-Lasky Studios.  
Metro Studios.  
William Fox Studios.



## WESTINGHOUSE PRODUCTS

A small number of Westinghouse products is listed below to give an idea of the great variety of electrical apparatus manufactured, and the many extensive fields for their use.

### FOR INDUSTRIAL USE

Motors and controllers for every application, the more important of which are: Machine shops, wood-working plants, textile mills, steel mills, flour mills, cement mills, brick and clay plants, printing plants, bakeries, laundries, irrigation, elevators and pumps

Welding outfits

Micarta gears

Heating devices for industrial use, such as: Glue pots, immersion heaters, space heaters, solder pots, and electric ovens

Safety switches and panel boards

Fuses

Electric furnaces

Lighting equipment

### FOR POWER PLANTS AND TRANSMISSION LINES

Circuit-breakers and switches

Condensers

Controllers

Control switches

Frequency changers

Fuses and fuse blocks

Generators

Insulating material

Mazda lamps

Lightning arresters

Line material

Locomotives

Meters

Motors

Motor-generators

Rectifiers

Regulators

Relays

Solder and soldering fluids

Stokers

Substations, portable

Switchboards

Synchronous converters

Transformers

Turbine-generators

### FOR TRANSPORTATION

Locomotives

Railway equipment

Marine equipment

### FOR MINES

Mazda lamps

Locomotives

Motors for hoists and pumps

Motor-generators

Portable substations

Switchboards

Line material and rail bonds

Ventilating outfits

Welding outfits

### FOR FARMS

Light and power plant

Portable power stand

Motors for driving churns, cream separators, corn shellers, feed grinders, pumps, air compressors, grindstones, fruit cleaning machines and sorting machines.

Generators for light, power, and heating apparatus

Transformers

Outdoor switching and metering equipment

### FOR OFFICE AND STORE

Electric radiators

Fans

Mazda lamps

Radio equipment

Small motors for driving addressing machines, dictaphones, adding machines, cash carriers, moving window displays, signs, flashers, envelope sealers, duplicators, etc.

Ventilating outfits

### FOR ELECTRIC AND GASOLINE AUTOMOBILES AND THE GARAGE

Battery charging outfits

Charging plugs and receptacles

Mazda lamps

Meters

Motors and controllers

Small motors for driving lathes, tire pumps, machine tools, polishing and grinding lathes

Solder and soldering fluids

Starting, lighting and ignition systems, embracing: Starting motors, generators, ignition units, lamps, headlights, switches, etc.

### FOR THE HOME

Electric appliances, including: Toaster stoves, toasters, irons, warming pads, curling irons, coffee percolators, chafing dishes, disc stoves, radiators

Automatic electric ranges

Fans

Mazda lamps

Small motors for driving coffee grinders, ice cream freezers, ironing machines, washing machines, vacuum cleaners, sewing machines, small lathes, polishing and grinding wheels, pumps and piano players

Sew-motors

Rectigon battery chargers

Radio equipment



# Westinghouse Electric & Manufacturing Co.

## East Pittsburgh, Pa.

### WESTINGHOUSE DISTRICT OFFICES

ALBANY, N. Y., Journal Building.  
 ATLANTA, GA., Candler Bldg., 127 Peachtree St.  
 BALTIMORE, MD., Westinghouse Bldg., 121 E. Baltimore St.  
 BIRMINGHAM, ALA., Brown-Marx Bldg., First Ave. and Twentieth St.  
 BLUEFIELD, W. VA., Law and Commerce Building, Federal and Raleigh Sts.  
 BOSTON, MASS., Rice Building, 10 High St.  
 BUFFALO, N. Y., Ellicott Square Bldg., Ellicott Square.  
 BUTTE, MONT., Montana Electric Co. Bldg., 52 East Broadway.  
 CHARLESTON, W. VA., Kanawha National Bank Bldg., Capitol and Virginia Sts.  
 CHARLOTTE, N. C., Commercial Bank Bldg., Rooms 409-10-11.  
 CHATTANOOGA, TENN., Hamilton National Bank Building, 701 Market St.  
 CHICAGO, ILL., Conway Bldg., 111 W. Washington Street.  
 CINCINNATI, O., Westinghouse Bldg., Third and Elm Sts.  
 CLEVELAND, O., Swetland Bldg., 1010 Euclid Ave.  
 COLUMBUS, O., Interurban Terminal Bldg., Third and Rich Sts.  
 DALLAS, TEX., Exchange Bldg., Akard and Wood Street.  
 DAYTON, O., Reibold Bldg., South Main St.  
 DENVER, COLO., Gas and Electric Bldg., 910 Fifteenth St.  
 DES MOINES, IOWA, 608 Securities Bldg., 412 W. Seventh St.  
 DETROIT, MICH., Dime Savings Bank Bldg., Fort and Griswold Streets.  
 DULUTH, MINN., Alworth Bldg., 306 West Superior St.  
 EL PASO, TEX., Mills Bldg., Oregon and Mills St.  
 FRESNO, CAL., J and Mariposa Streets.  
 HOUSTON, TEX., Union National Bank Building, Main and Congress Streets.  
 INDIANAPOLIS, IND., Traction Terminal Bldg., Illinois and Market Sts.

\*Government business exclusively.

JACKSONVILLE, FLA., Union Terminal Warehouse, East Union and Ionia Streets.  
 KANSAS CITY, MO., Orear-Leslie Bldg., 1012 Baltimore Ave.  
 LOUISVILLE, KY., Paul Jones Building, 312 Fourth Ave.  
 LOS ANGELES, CAL., I. N. Van Nuys Bldg., Seventh and Spring Streets.  
 MEMPHIS, TENN., Exchange Bldg., 6 N. Second St.  
 MILWAUKEE, WIS., First National Bank Bldg., 425 E. Water St.  
 MINNEAPOLIS, MINN., Met. Life Insurance Bldg., 119-131 S. Third St.  
 NEW ORLEANS, LA., Maison Blanche Bldg., 921 Canal St.  
 NEW YORK, N. Y., City Investing Bldg., 165 Broadway.  
 NIAGARA FALLS, N. Y., 205 Falls Street.  
 PHILADELPHIA, PA., Widener Bldg., 1325-1329 Chestnut St.  
 PITTSBURGH, PA., Union Bank Bldg., 306 Wood St.  
 PORTLAND, ORE., Northwestern Bank Bldg., Broadway and Morrison Sts.  
 ROCHESTER, N. Y., Chamber of Commerce Bldg., 119 E. Main Street.  
 ST. LOUIS, MO., 300 N. Broadway.  
 SALT LAKE CITY, UTAH, Walker Bank Bldg., Second Street, South and Main Sts.  
 SAN FRANCISCO, CAL., First National Bank Bldg., 1 Montgomery Street.  
 SEATTLE, WASH., Westinghouse Bldg., W. Spokane Street and E. Marginal Way.  
 SYRACUSE, N. Y., University Bldg., 120 Vanderbilt Square.  
 TOLEDO, O., Ohio Bldg., Madison Ave. and Superior St.  
 TUCSON, ARIZ., Immigration Bldg., 90 Church Street.  
 WASHINGTON, D. C., \*Hibbs Bldg., 723 Fifteenth St., N. W.  
 WILKES-BARRE, PA., Miner's Bank Building, W. Market and Franklin Streets.  
 The Hawaiian Electric Company, Ltd., Honolulu, T. H.—Agent.

### WESTINGHOUSE AGENT-JOBBER

ATLANTA, GA., Gilham Schoen Electric Co.  
 BIRMINGHAM, ALA., The Moore-Handley Hardware Co.  
 BLUEFIELD, WEST VIRGINIA, Superior Supply Co.  
 BUFFALO, N. Y., McCarthy Bros. & Ford.  
 BUTTE, MONTANA, The Montana Electric Co.  
 CHICAGO, ILL., Illinois Electric Co.  
 CINCINNATI, OHIO, The Johnson Electric Supply Co.  
 CLEVELAND, OHIO, The Erner Electric Co.  
 DENVER, COLO., Mine & Smelter Supply Co.  
 DETROIT, MICH., Commercial Electric Supply Co.  
 EL PASO, TEXAS, Mine & Smelter Supply Co.  
 EVANSVILLE, IND., The Varney Electrical Supply Co.  
 HOUSTON, TEXAS, Tel-Electric Co.  
 HUNTINGTON, WEST VIRGINIA, Banks Supply Co.  
 INDIANAPOLIS, IND., The Varney Electrical Supply Co.  
 JACKSONVILLE, FLA., Pierce Electric Co.  
 KANSAS CITY, MO., Satterlee Electric Co.  
 LOS ANGELES, CAL., Illinois Electric Co.  
 LOUISVILLE, KY., Tafel Electric Co., Inc.  
 MEMPHIS, TENN., Riechman-Crosby Co.  
 MILWAUKEE, WIS., Julius Andrae & Sons Co.  
 NEW HAVEN, CONN., Hessel & Hoppen Co.

NEW ORLEANS, LA., Electrical Supply Co.  
 NEW YORK, N. Y., Northwestern Electric Equipment Co.  
 OKLAHOMA CITY, OKLA., United Electric Co.  
 OMAHA, NEB., The McGraw Co.  
 PHILADELPHIA, PA., H. C. Roberts Electric Supply Co.  
 PITTSBURGH, PA., Robbins Electric Co.  
 PORTLAND, ORE., Fobes Supply Co.  
 RICHMOND, VA., Tower-Binford Electric & Mfg. Co.  
 ROCHESTER, N. Y., Rochester Electrical Supply Co.  
 SALT LAKE CITY, UTAH, Intermountain Electric Co.  
 SAN FRANCISCO, CAL., Electric Rwy. & Mfrs. Supply Co.  
 SCRANTON, PA., Penn. Electrical Engineering Co.  
 SEATTLE, WASH., Fobes Supply Co.  
 SIOUX CITY, IOWA, The McGraw Co.  
 SPOKANE, WASH., The Washington Electric Supply Co.  
 ST. JOSEPH, MO., Columbian Electrical Co.  
 ST. LOUIS, MO., Central Telephone & Electric Co.  
 ST. PAUL, MINN., St. Paul Electric Co.  
 SYRACUSE, N. Y., H. C. Roberts Electric Supply Co.  
 TAMPA, FLA., Pierce Electric Co.  
 TULSA, OKLA., United Electric Co.  
 WICHITA, KANSAS, United Electric Co.

### WESTINGHOUSE SERVICE SHOPS

ATLANTA, GA., Cor. Markham and Mangum Sts.  
 BALTIMORE, MD., 501 East Preston St.  
 BOSTON, MASS., 12 Farnsworth St.  
 BUFFALO, N. Y., 141-157 Milton St.  
 CHICAGO, ILL., 32 South Peoria St.  
 CINCINNATI, O., Third and Elm Sts.  
 CLEVELAND, O., 1255 West Fourth St.  
 DENVER, COLO., 1909-11-13-15 Blake St.  
 DETROIT, MICH., Westinghouse Bldg., 6th St.  
 HARTFORD, CONN., 220 Market St.

LOS ANGELES, CAL., 2019 Bay St.  
 NEW YORK, N. Y., 467 Tenth Ave.  
 PHILADELPHIA, PA., 214-220 North 22nd St.  
 PITTSBURGH, PA., 6905 Susquehanna St.  
 ST. LOUIS, MO., 1906 Pine St.  
 SALT LAKE CITY, UTAH, 573 W. 2nd St. So.  
 SAN FRANCISCO, CAL., 1400 Fourth St.  
 SEATTLE, WASH., 3451 East Marginal Way.  
 SPRINGFIELD, MASS., 82-86 Worthington St.

### CANADIAN COMPANY

CANADIAN WESTINGHOUSE COMPANY, LTD., Hamilton, Ontario

### WESTINGHOUSE ELECTRIC INTERNATIONAL COMPANY

165 BROADWAY, NEW YORK, U. S. A.



